

COUNTIS **E23/E24**

*Three-phase active energy meter
63A direct MODBUS*

Operating instructions **EN**



Contents

1. DOCUMENTATION	3
2. DANGER AND WARNING	3
2.1. RISK OF ELECTROCUTION, BURNS OR EXPLOSION	3
2.2. RISK OF DAMAGING DEVICE	3
3. PRELIMINARY OPERATIONS	3
4. OVERVIEW	4
4.1. MAIN FUNCTIONS	4
4.2. DISPLAY VIEWS	4
5. INSTALLATION	5
5.1. RECOMMENDATIONS	5
5.2. DIMENSIONS (MM)	5
5.3. TERMINALS	5
5.4. CONNECTIONS	6
5.4.1. 4-WIRE CONNECTION - 4-WIRE LOAD MONITORING	6
5.4.2. 4-WIRE CONNECTION - 3-WIRE LOAD MONITORING	6
5.5. SEALABLE COVERS	6
6. MODBUS COMMUNICATION	7
6.1. GENERAL INFORMATION	7
6.2. RECOMMENDATIONS	7
6.3. COMMUNICATION STRUCTURE	7
6.4. COMMUNICATION TABLE	7
7. PROGRAMMING	8
7.1. NAVIGATION PRINCIPLE	8
7.2. PROGRAMMING MENU OVERVIEW	8
7.3. DETAILED VIEW OF MODBUS PROGRAMMING MENU	9
8. OPERATION	10
8.1. DETAILED VIEW OF MENUS	11
8.2. DETAILED VIEW OF "PARTIAL ENERGIES"	12
8.3. DETAILED VIEW OF "PARTIAL ENERGIES" RESET	12
9. DIAGNOSTIC MESSAGES	13
9.1. MISSING PHASES	13
9.2. PHASE INVERSION	13
9.3. MALFUNCTION	13
10. ASSISTANCE	13
11. ELECTRICAL AND TECHNICAL CHARACTERISTICS	14
12. MID COMPLIANCE	15

1. Documentation

All the documentation for **COUNTIS E23/E24** equipment is available online at:

www.socomec.com/en/countis-e2x



2. Danger and warning

This equipment must only be installed by professionals.

The manufacturer shall not be held responsible for failure to comply with the instructions in this manual.

2.1. Risk of electrocution, burns or explosion

- The device must be installed and serviced only by qualified personnel.
- Always use an appropriate voltage detection device to confirm the absence of voltage.
- Replace all devices, doors, and covers before turning on power to this equipment.
- Always supply the device with the correct rated voltage.

Failure to take these precautions could cause serious injuries.

2.2. Risk of damaging device

Check the following:

- the mains frequency (50 Hz).
- the maximum voltage at the voltage input terminals is 276 VAC phase/neutral.
- a maximum current of 63 A.

3. Preliminary operations

For personnel and product safety, please carefully read the contents of these operating instructions before installation.

Check the following points as soon as you receive package containing the **COUNTIS E23/E24**:

- the packaging is in good condition,
- the product has not been damaged during transportation,
- the product reference number conforms to your order,
- the packaging contains the product, two sealable covers, two plastic seals and a Quick Start guide.

4. Overview

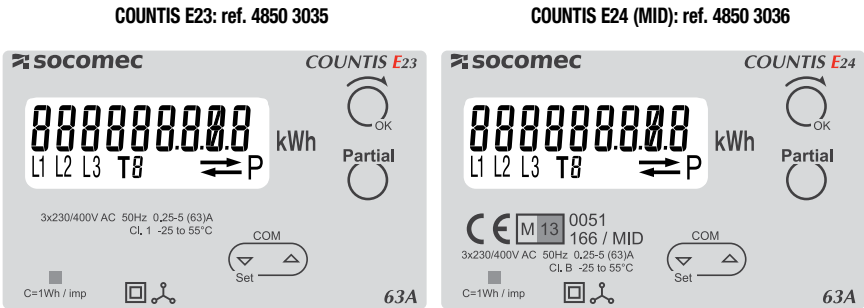
COUNTIS E23 and **E24** are active modular electrical energy meters for monitoring kWh. They are designed for three-phase networks and enable direct connection up to 63A. They are equipped with a MODBUS communication bus.

4.1. Main functions

- Measurement and display of total and partial active energy (Ea+/Ea-)
- Management of two tariffs: T1/T2
- Measurement of electrical parameters accessible via the communication
 - Voltage P-P: U12/U23/U31
 - Voltage P-N: V1, V2, V3
 - Frequency: F
 - Current: I1/I2/I3/In
 - Active power $\pm$: P1/P2/P3/ Σ P
 - Reactive power $\pm$: Q1/Q2/Q3/ Σ Q
 - Apparent power: S1/S2/S3/ Σ S
 - Power factor $\pm$: PF1/PF2/PF3/ Σ PF
 - Total and partial active energy: Ea+ / Ea-
 - Total reactive energy: Er+
 - Active energy per tariff: Ea+
 - Reactive energy per tariff: Er+
- MODBUS communication
- MID version (according to reference)

Description	Reference
COUNTIS E23	4850 3035
COUNTIS E24 (MID)	4850 3036

4.2. Display views



000000000



9-digit LCD display
Active energy imported ->/exported <-

L1 L2 L3

Phase detection

T8

Current tariff

P

Partial active energy

C=1Wh / imp

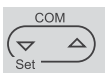
Metrological LED



Selection button



Button to display partial active energy



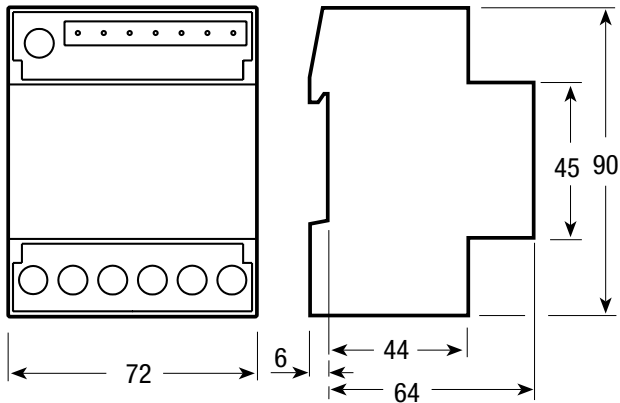
Configuration button

5. Installation

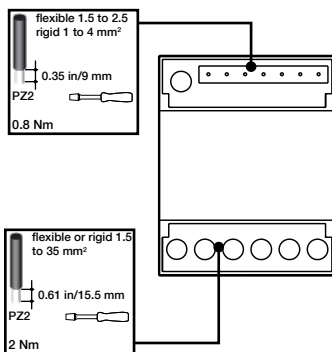
5.1. Recommendations

- avoid proximity to systems which generate electromagnetic interference,
- avoid vibrations with accelerations in excess of 1 G for frequencies below 60 Hz.

5.2. Dimensions (mm)

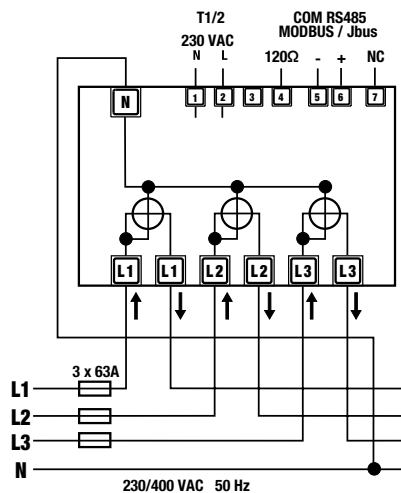


5.3. Terminals



5.4. Connections

5.4.1. 4-wire connection - 4-wire load monitoring



Tariff

1-2: Change of tariff only for COUNTIS E24:
0 VAC -> Tariff 1
230 VAC -> Tariff 2
(change of tariff via MODBUS for COUNTIS E23).

MODBUS

4: Activation of 120 ohm terminating resistors by connecting terminals 4 and 5.

5: -

6: +

7: NC (not connected).

Mains

L1↑: Phase input

L1↓: Phase output.

L2↑: Phase input

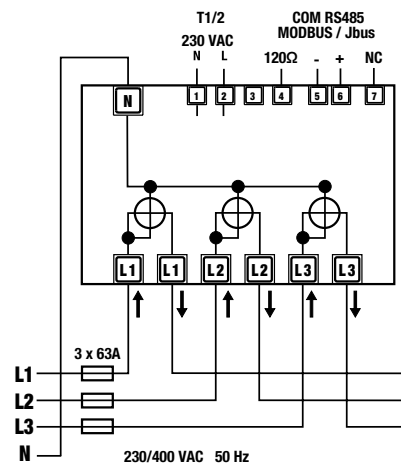
L2↓: Phase output.

L3↑: Phase input

L3↓: Phase output.

N: Neutral connection.

5.4.2. 4-wire connection - 3-wire load monitoring



Tariff

1-2: Change of tariff only for COUNTIS E24:
0 VAC -> Tariff 1
230 VAC -> Tariff 2
(change of tariff via MODBUS for COUNTIS E23).

MODBUS

4: Activation of 120 ohm terminating resistors by connecting terminals 4 and 5.

5: -

6: +

7: NC (not connected).

Mains

L1↑: Phase input

L1↓: Phase output.

L2↑: Phase input

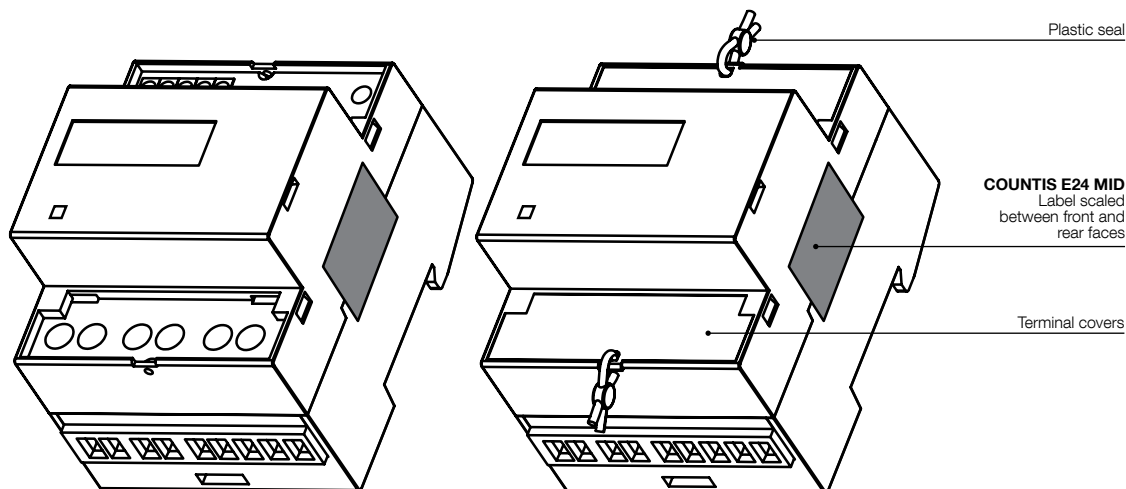
L2↓: Phase output.

L3↑: Phase input

L3↓: Phase output.

N: Neutral connection.

5.5. Sealable covers



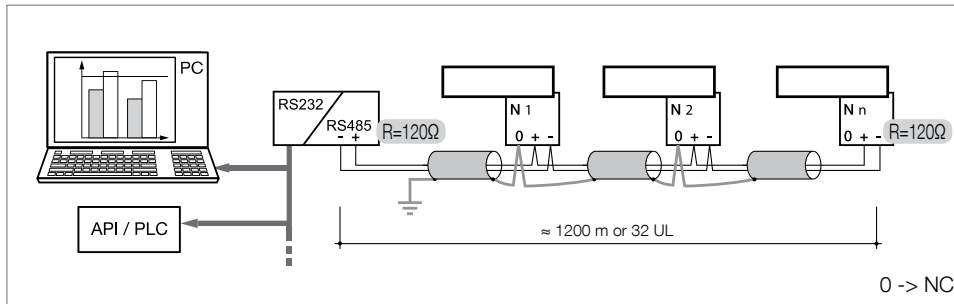
6. MODBUS communication

6.1. General Information

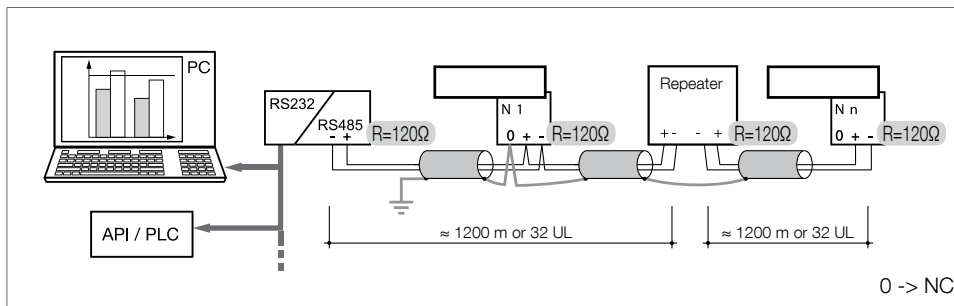
MODBUS® communication is performed via a RS485 serial port (2- or 3-wire) which enables products to be used from a PC or an API.

On a standard configuration, a RS485 port can be used to connect 32 products to a PC or a PLC across 1200 meters.

MODBUS wiring



Wiring with repeater



6.2. Recommendations

It is necessary to use a shielded twisted pair (LIYCY type). In an environment where there is interference or large network (in terms of length) we recommend the use of a shielded twisted pair (type LIYCY-CY).

A repeater should be used to connect additional products if the distance of 1200 m and/or maximum number of 32 products is exceeded.

A 120-ohm resistor must be fixed at both ends of the link.

6.3. Communication structure

The product communicates via a MODBUS® protocol, which involves a dialogue using a master-slave structure. The mode of communication is the RTU (Remote Terminal Unit) mode using hexadecimal characters of at least 8 bits.

MODBUS® frame structure(master -> slave exchange):

Slave address	Function code	Address	Number of words to read	CRC 16
1 byte	1 byte	2 bytes	2 bytes	2 bytes

6.4. Communication table

The communication tables and associated explanations are available on the **COUNTIS E23/E24** documentation page online at the following address:

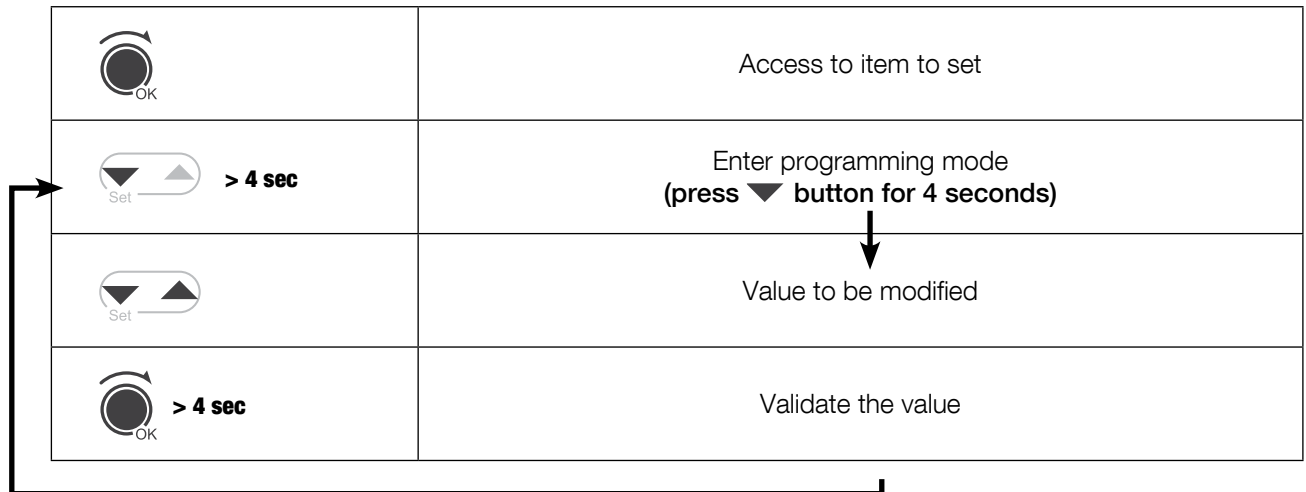
www.socomec.com/en/countis-e2x



7. Programming

7.1. Navigation principle

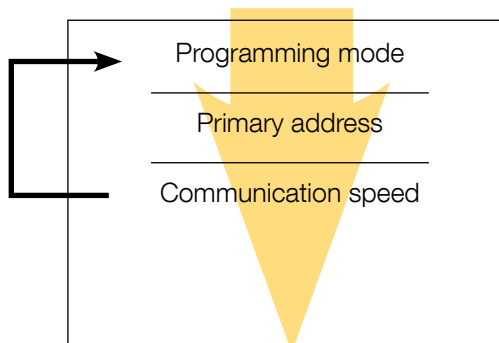
The programming mode enables the communication parameters to be modified. The process to navigate inside the programming mode is described in the following steps:



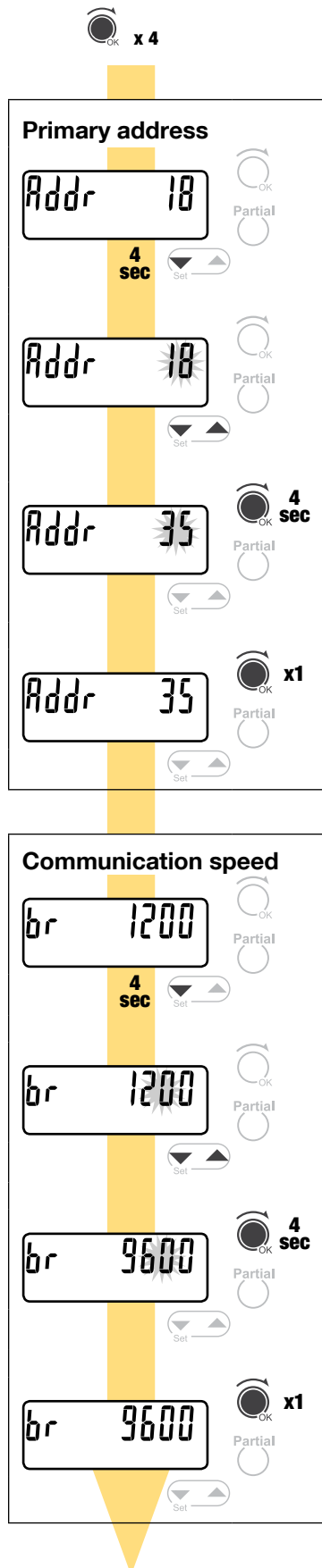
7.2. Programming menu overview

By pressing ▼ for 4 seconds, the device will enter the programming mode.

The various screens are accessible according to the sequence:

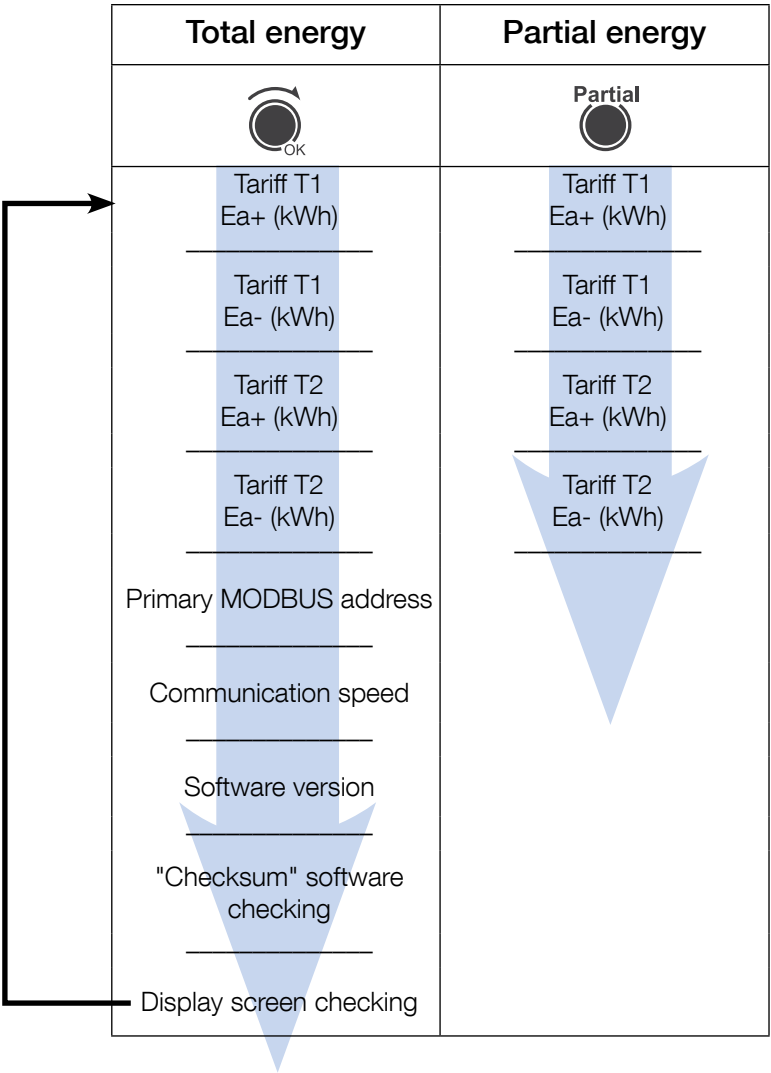


7.3. Detailed view of MODBUS programming menu

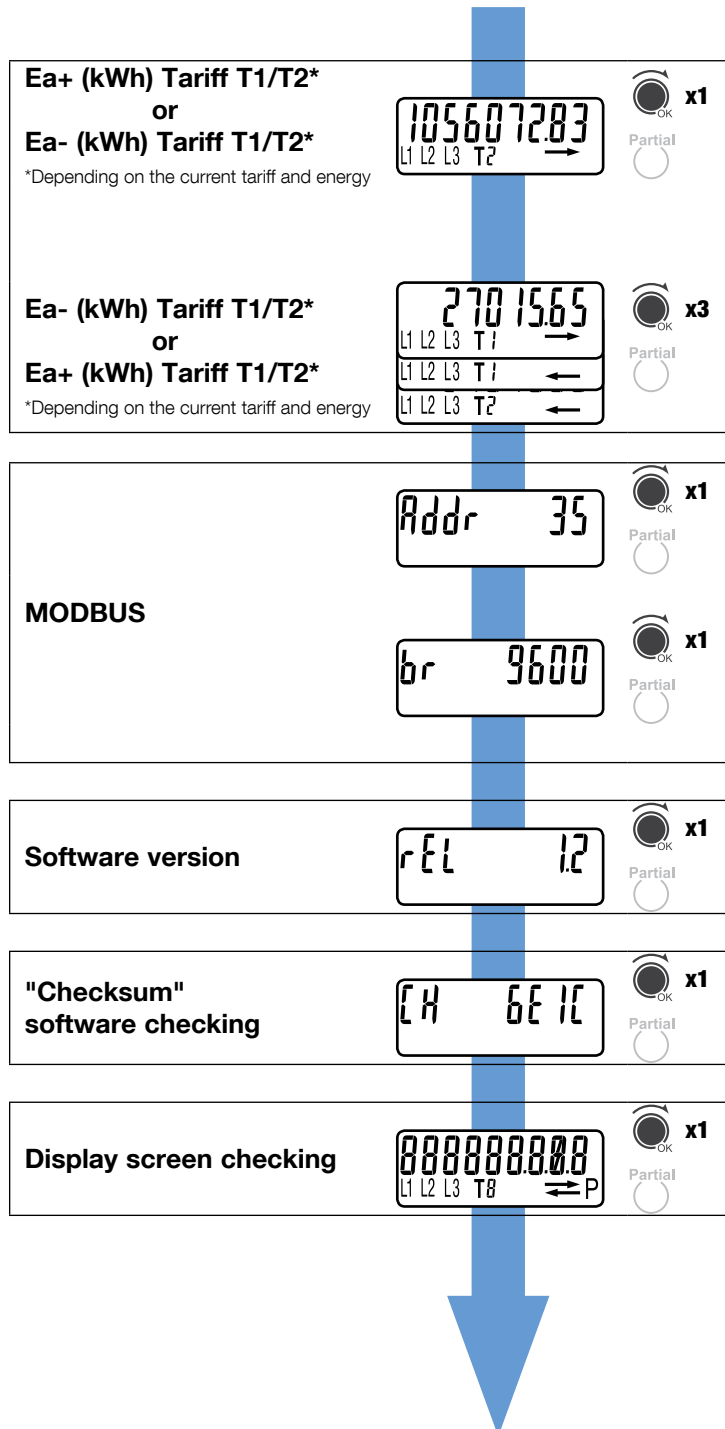


8. Operation

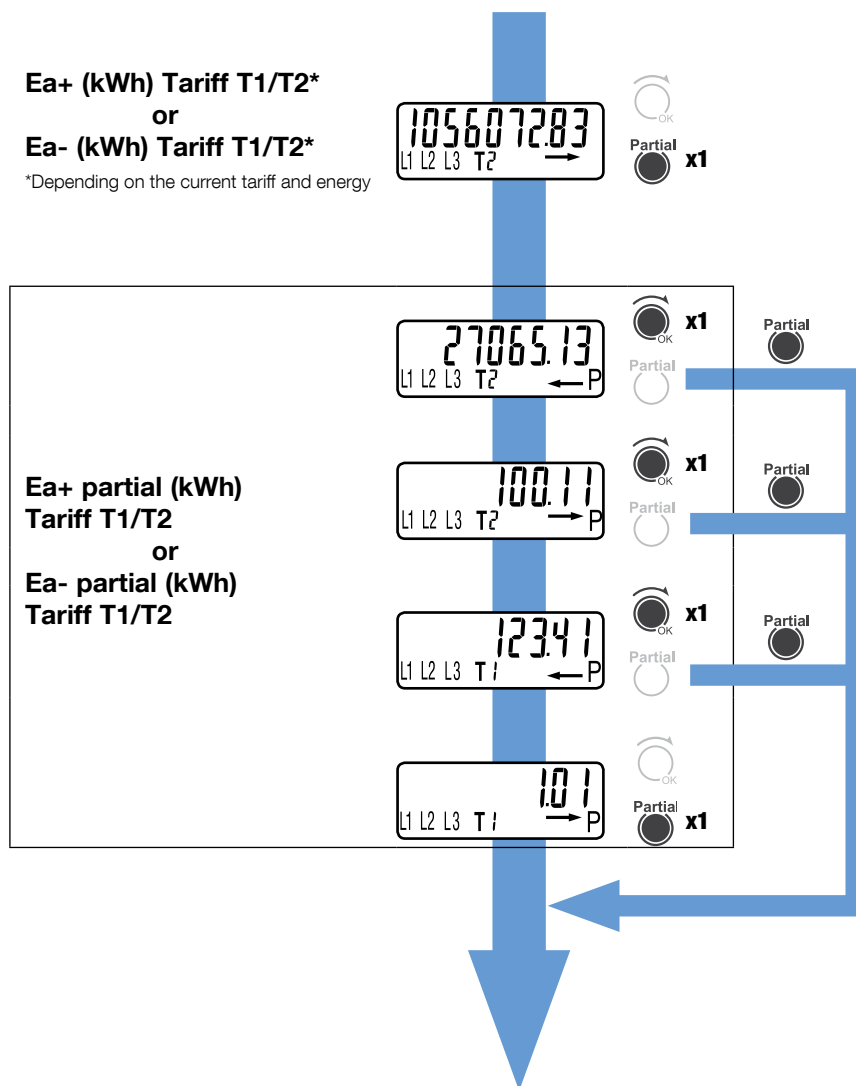
The total and partial active energy values are accessible via the dedicated buttons. Pressing the appropriate button several times displays all the available measurements. All the available information and measurements are described in the following diagram:



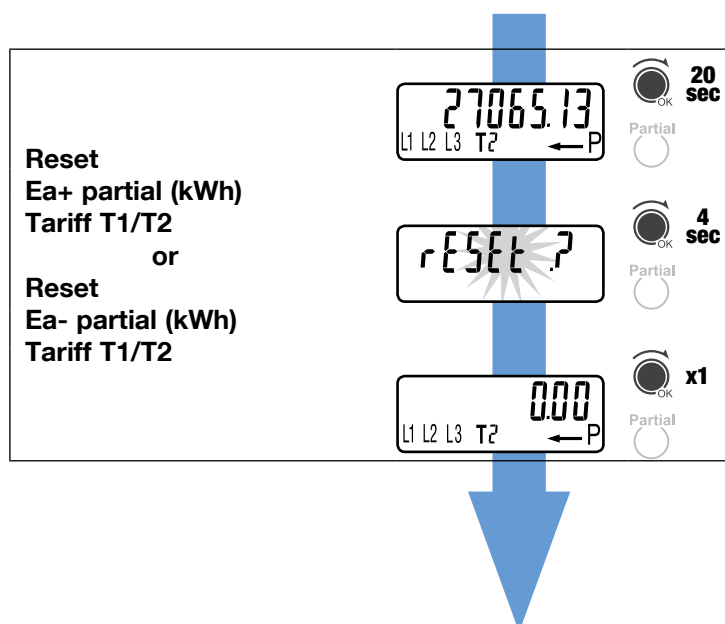
8.1. Detailed view of menus



8.2. Detailed view of "Partial energies"



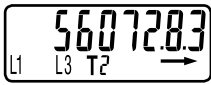
8.3. Detailed view of "Partial energies" reset



9. Diagnostic messages

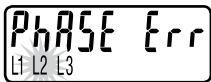
The following messages appear when there is a connection error or malfunction error.

9.1. Missing phases



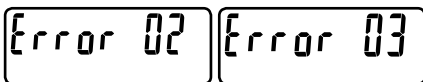
- If one or more phases cannot be detected, the corresponding icons will not be displayed on-screen.
Example: phase 2 (L2) is not detected.

9.2. Phase inversion



- If a phase inversion is detected, the phase icons flash.
- To clear this message, without changing the connection, press and hold the OK button for 4 seconds.
(Warning: the measurement may be wrong).

9.3. Malfunction



- When these messages are displayed, the meter has malfunctioned and should be replaced.

10. Assistance

Causes	Solutions
Missing phases on display	Verify the connections
Phase inversion on display	Check mains configuration
Error message	Check that the meter is working correctly

11. Electrical and Technical characteristics

Generalities	
Case	4 DIN 43880 modules
Mounting	DIN EN 60715 rail
Width	72 mm
Operating specifications	
Connectivity	Three-phase - 4-wire 230/400V
Storage of energy values and configuration	Yes: EEPROM
Tariff display identifier	T1 and T2
Power supply	
Certified voltage Un	230 VAC
Operating voltage range	184 ... 276 VAC
Certified frequency fn	50 Hz
Rated power consumption (max.) Pv	≤ 8 VA (0.6 W)
Overload	
Direct voltage Un	480 VAC phase/phase
Instantaneous voltage Un (1 s)	800 V phase/phase
Direct current Imax	63 A
Instantaneous current Imax (10 ms)	1890 A
Display	
Screen	9 digits (2 decimal places)
Active energy: 1 9-digit screen	0.01 -> 9999999.99 kWh
Measurement updating period	1 s
Measurement accuracy	
Active power and energy (E23)	Class 1 IEC 62053-21
Active power and energy (E24)	Class B EN 50470-3
Input measurement	
Connection type	400 V phase/phase
Voltage measurement range	184 ... 276 VAC phase/N
Current Iref	5 A
Current Imin	0.25 A
Current measurement range (Ist ... Imax)	0.015 ... 63 A
Certified frequency	50 Hz
Start-up current for energy measurement (Ist)	15 mA
Optical interfaces	
Pulse value	1 Wh/imp
Safety	
Internal meter	yes
Degree of pollution	2
Operating voltage	300 VAC
AC voltage test (EN 50470-3, 7.2)	4 kV
Voltage pulse test	6 kV
Protection class (EN 50470)	Class II
Case fire resistance class	Class V0
Integrated communication	
MODBUS	2400 to 38,400 bps
Connection terminals	
Cross-section of phase connections	flexible or rigid: 1.5 to 35 mm ²
Cross-section of tariff and communication connections	flexible 1.5 to 2.5/rigid 1 to 4 mm ²
Environmental conditions	
Mechanical environment	M1
Electromagnetic environment	E2
Operating temperature	-25 ... +55°C
Storage temperature	-25 ... +70°C
Relative humidity	≤ 80%
Amplitude of 50 Hz vibrations	±0.075 mm
IP rating	IP51(*)/IP20

(*) For installation in an enclosure with at least IP51 protection.

12. MID compliance

The COUNTIS E24 meter complies with the MID directive for connection of three-phase networks (see "5.4. Connections", page 6).

After connecting the product, check that the terminal covers are correctly fitted and secured by the 2 plastic seals supplied with the product (see "5.5. Sealable covers", page 6). If the terminal covers must be removed, ensure that the same seal part numbers are used (ref. 4850 304U).

The information given via the communication bus is only sent by way of information and has no legal value.

The assigned operating conditions guaranteeing MID compliance are available in the technical specifications tables.

The MID declaration of conformity for the COUNTIS E24 is available online at: www.socomec.com/en/countis-e2x



Socomec worldwide

IN WESTERN EUROPE

BELGIUM

B - 1070 Bruxelles
Tel. +32 2 340 02 30
info.be@socomec.com

FRANCE

F - 94132 Fontenay-sous-Bois Cedex
Tel. +33 1 45 14 63 30
info.scp.fr@socomec.com

GERMANY

D - 76275 Ettlingen
Tel. +49 7243 65292 0
info.scp.de@socomec.com

ITALY

I - 20098 San Giuliano Milanese (MI)
Tel. +39 02 98 49 821
info.scp.it@socomec.com

NETHERLANDS

NL - 3991 CD Houten
Tel. +31 30 760 0900
info.nl@socomec.com

SPAIN

E - 08329 Teià (Barcelona)
Tel. +34 93 540 75 75
info.es@socomec.com

UNITED KINGDOM

Hitchin Hertfordshire SG4 0TY
Tel. +44 1462 440 033
info.scp.uk@socomec.com

IN EASTERN EUROPE, MIDDLE EAST, AFRICA

POLAND

01-625 Warszawa
Tel. +48 91 442 64 11
info.scp.pl@socomec.com

ROMANIA

023383 Bucharest
Tel. +40 21 319 36 88
info.ro@socomec.com

RUSSIA

125167 - Moscow
Tel. +7 495 775 19 85
info.ru@socomec.com

SLOVENIA

SI - 1000 Ljubljana
Tel. +386 1 5807 860
info.si@socomec.com

TURKEY

34775 Istanbul
Tel. +90 216 540 71 20-21-22
info.tr@socomec.com

UNITED ARAB EMIRATES

Dubai, U.A.E.
Tel. +971 4 29 98 441
info.ae@socomec.com

IN ASIA

CHINA

P.R.C 200052 Shanghai - China
Tel. +86 21 52 98 95 55
info.cn@socomec.com

INDIA

122001 Gurgaon, Haryana - India
Tel. +91 124 4027210
info.scp.in@socomec.com

SINGAPORE

Singapore 408723
Tel. +65 6506 7600
info.sg@socomec.com

IN NORTH AMERICA

USA, CANADA & MEXICO

Cambridge, MA 02142 USA
Tel. +1 617 245 0447
info.us@socomec.com

HEAD OFFICE

SOCOMECH GROUP

S.A. SOCOMECH capital 10 951 300 €
R.C.S. Strasbourg B 548 500 149
B.P. 60010 - 1, rue de Westhouse
F-67235 Benfeld Cedex - FRANCE



www.socomec.com

INTERNATIONAL SALES DEPARTMENT

SOCOMECH

1, rue de Westhouse - B.P. 60010
F - 67235 Benfeld Cedex - FRANCE
Tel. +33 (0)3 88 57 41 41
Fax +33 (0)3 88 74 08 00
info.scp.isd@socomec.com

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